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ADMINISTRATION REPORT

OF THE

DIRECTOR OF AGRICULTURE

FOR THE YEAR

1936.

GEORGETOWN, DEMERARA:
PRINTERS TO THE GOVERNMENT OF BRITISH GUIANA.
"THE ARGOSY" COMPANY, LIMITED.
1937.

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British Guiana.

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DIRECTOR OF AGRICULTURE

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DEPARTMENT OF AGRICULTURE.

ADMINISTRATION REPORT OF THE DIRECTOR OF AGRICULTURE FOR 1936.

SECTION I.
AGRICULTURE IN THE COLONY.

General.

Although the year under review may be said to have pursued a somewhat uneventful course from the agricultural standpoint, the planter and farmer once again found their plans disturbed by abnormal weather conditions. The mid-year rains began as early as March, to cease in July, and were followed by three or four months of severe dry weather, which proved disastrous to much of the autumn rice crop. Fortunately, the sugar crop reaped in 1936 was scarcely affected and the after effects will only be felt on the sugar estates in 1937.

2. Record yields, assisted by preferences in the United Kingdom and Canadian markets, have enabled the sugar industry to continue to play its rôle as the Colony's mainstay, despite reduced values for sugar. Indeed, the importance of this industry in the economic life of the Colony gathers strength as the years go by.

3. Colony production continued on the upward trend and again a record output resulted. Although prices reached low levels, the effect of larger crops in recent years has been to keep substantial sums of money, expended on labour, in circulation and this is reflected in improved trade conditions generally during the period under review. Rum exports were the highest on record since 1922 and were about 400,000 gallons more than in the previous year. This is attributed partly to the continued replacements of stocks destroyed in the 1933 London fire and to the effect of rum propaganda on sales.

4. The steady increase in cane-farming was maintained.

5. The export of rice showed a marked increase over the preceding year, but unfortunately the poor autumn crop may lead to a decrease in 1937. A Trade Mission left the Colony on January 5, on a visit to Trinidad and Barbados to make investigations on behalf of the rice industry. The members of the delegation were Prof. the Hon. J. S. Dash, Director of Agriculture, Messrs. H. G. Seaford, O.B.E., Chairman of the B.G. Rice Marketing Board, Abdool Rayman, C. A. McDoom and Boodhoo. Mr. I. McLean who was proceeding to Barbados on holiday was asked to join the delegation. In the Islands, discussions were held with the Provision Dealers' Associations, the Commission Agents' Associations, and other commercial organisations. One of the factors giving rise to this Mission was the fairly good 1935 autumn rice crop and the large stocks of milled rice and padi on hand awaiting disposal. The object of the delegation was to obtain the best terms possible for the sale of this and future crops. The Director of Agriculture also had conversations with the Governments of Trinidad and Barbados on various trade matters.

6. The rice industry continues to suffer from many disabilities, the more important of which could be eased, if not entirely removed, if there was greater co-operation. A great deal of time is spent by the Administrative Officers of the Department in studying, conferring and advising in regard to the problems of this industry. Unfortunately, those engaged in it, from the producer to the exporter, show little inclination to face the real issues in spite of every effort to that end. It has been pointed out in previous reports that the financial entanglements and ramifications which have existed over a long period of years exert a baneful influence and are perhaps the greatest obstacle to co-operative endeavour. The large number of inefficient mills and the slipshod methods of purchasing and handling padi thereat

constitute a serious drawback. While considerable time, energy and organised effort have been devoted by the Department to the development of improved strains and their distribution, landlord-millers, with few exceptions, do not exercise that close supervision on seed supplies which is essential if the best results are to be obtained. Nor again, generally speaking, is the careful cultivator rewarded by a proportionately better price for his padi. He must be content with any increases in yield obtained from the use of selected seed. Storage facilities at the mills leave much to be desired, the result being that padi and milled rice soon become liable to pest damage even if stored for reasonably short periods. Ordinances leading to better marketing conditions, including trade inducements such as grading, and for improving conditions at the mills and the business methods of the millers in their relations with cultivators, are in operation, but it is a sad reflection that so many strive to defeat the objects of such beneficial legislation instead of co-operating to ensure that the greatest possible benefits are derived therefrom.

7. While progress has been made and *exports have, during the last ten-year period, almost trebled those of the previous ten years, competition in our export markets is such to-day that unless a new spirit is shown, the industry's difficulties are not likely to diminish—indeed they are quite likely to increase. All this is so much to be regretted since rice is one of the very few crops suited to the Colony's low-lying coastal lands, while there are large markets at our door where an expansion in production could readily be absorbed. Later in this report reference is made to the appointment of a Committee by Government to consider fully the existing position in regard to the export trade and pertinent matters.

8. A welcome rise in the price of copra, taken in conjunction with a larger output of manufactured products by the local oil mills, resulted in an increase in production of copra of nearly 50 per cent. over the previous year.

9. The state of the Liberian coffee industry, which has been causing much anxiety, owing to the continued fall in prices, has not improved with the closing of the principal coffee factory in the North West District, the chief coffee growing area of the colony and one in which coffee is almost the only permanent crop. Exports have further declined to $15,000 in value. Luckily, there is a protected local market and the Liberian coffee plant possesses remarkable qualities of resistance to hardship and neglect. It is hoped that improved trade conditions generally will cause some improvement in price.

10. The possibility of furthering the colony's plantain trade with the nearer West Indian Islands was investigated during the year, and the question of establishing a central marketing agency was mooted. Up to the present, however, it has not been found possible to improve the trade arrangements with the neighbouring West Indian importers owing to intensive Venezuelan competition facilitated by the ease of communication with Trinidad enjoyed by Venezuelan producers. The whole question is still under examination.

11. Honey continues to increase in importance, local sales being advanced materially and interest in the industry is securing a definite hold in the rural communities.

12. The planting of fruit, particularly citrus, was extended during the year. New plantings of limes in the North West District show considerable promise.

13. It is noted that the acreages under agricultural crops have shown a decrease, but the reasons are fully discussed under the head of 'Census Returns' elsewhere in this report. Experience has shown that this adjustment is likely to occur when prices for agricultural commodities are low and other sources of income such as sea defence operations and activity in mining and timber industries, offer

* Total exports 1917–1926—66,460 tons.
Do. do. 1927–1936—193,268 tons.

more attraction. Such adjustments have generally proved to be of a temporary nature, but they reflect the temperament of a large number of villagers in regard to sustained agricultural effort.

14. The report of the Livestock Trade Committee was published during the year, and in connection with this phase of agriculture, the formation of a Cattle Owners' Association was strongly urged by the Department, but it has not yet come into being, although the matter is still under discussion. Further reference is made to this report under the appropriate head. Meantime, efforts are being made to foster an export trade.

15. A further step was taken to better Agricultural Education in the colony by the institution of a course of Rural Science and Elementary Agriculture for school teachers which was attended by sixteen teachers. In addition to lectures and practical instruction in various phases of agriculture, a model school garden was laid out, in which each teacher cultivated his own plot of land.

16. Another event during the year was the appearance of the 'Farm Journal' a quarterly publication for local distribution only, written in simple language, and specially designed to help the small farmer and his family. It has been well received and commands a ready sale; the price is one penny per copy.

Weather Conditions.

17. Details of the meteorological data obtained during the year are to be found in the Annual Meteorological Report of the Department. Most of the factors that go to make up the Colony's weather remain nearly constant from year to year. The only marked changes that occur are in the rainfall, and the first abnormal feature of the rainfall for the year was the early arrival of the 'mid-year' rains, which began in the middle of March–April and May, especially the former, being much wetter than in normal years. But these rains having begun early also terminated sooner than usual, and the July rainfall as a whole was several inches below normal. Dry weather then continued until December, which month, however, was wetter than usual, bringing the total rainfall for the year up to the average, or in some cases above it. The effect of the weather on the principal crops is dealt with under the particular industries.

18. From the point of view of sugar production the rainfall distribution during the year under review was satisfactory, but in regard to rice the abnormal mid-year rains followed immediately by several months of dry weather adversely affected the autumn crop.

19. The following table shows the mean rainfall in the coastal area for 1936, in three counties, and the average rainfall for the period 1927–1936 inclusive.

TABLE I.

MEAN RAINFALL AT COASTAL STATIONS.

Months.	Berbice.		Demerara.		Essequibo.	
	1936. Inches.	1927-1936. Inches.	1936. Inches.	1927-1936. Inches.	1936. Inches.	1927-1936. Inches.
January	3.84	9.39	6.59	11.07	5.68	10.57
February	1.58	5.33	2.54	5.03	1.69	5.54
March	14.99	5.17	10.46	4.47	8.09	3.77
April	12.27	7.03	13.19	6.76	12.17	5.61
May	11.65	11.44	11.88	12.64	11.05	13.60
June	10.32	11.84	11.76	13.33	11.86	13.39
July	7.07	10.94	8.15	11.51	8.44	11.82
August	5.44	5.88	2.40	6.85	3.63	7.25
September	1.35	2.76	2.30	2.76	2.56	3.55
October	1.48	2.61	3.31	3.75	5.80	4.70
November	2.97	3.23	3.43	4.38	6.26	5.71
December	14.41	10.00	18.67	11.98	15.60	12.65
Total	87.37	85.62	94.68	94.53	92.83	98.16

AGRICULTURAL INDUSTRIES.

Sugar.

20. The major annual statistics covering the sugar industry for the ten years ending 1936 are shown in Table II.

TABLE II.

CANE ACREAGES, AND THE PRODUCTION AND EXPORTS OF SUGAR AND ITS BY-PRODUCTS—1927-1936.

Year.	Sugar Cane Acreage Reaped. English acres.	Sugar Produced from Area Reaped. Tons.	Yield per Acre Reaped. Tons.	Exports — Sugar. Tons.	Total Value in Dollars.	Value per ton in dollars.	Rum Produced. Proof Gallons.	Rum Exported. Proof Gallons.	Molasses Exported. Gallons.	Molascuit Exported. Tons.
1927	56,534	114,030	2.01	109,616	8,787,585	80.1	1,436,010	1,081,020	2,677,457	915
1928	53,489	116,484	2.17	114,687	8,124,666	71.0	1,745,293	1,269,923	2,873,468	1,832
1929	56,126	117,254	2.08	100,449	5,943,788	59.1	1,838,353	1,109,482	2,536,623	1,803
1930	54,264*	127,764*	2.35	114,542	5,418,884	47.3	1,571,371	846,319	3,851,337	400
1931	54,999*	126,143*	2.29	119,346	5,325,755	44.6	1,002,267	722,076	7,106,997	66
1932	55,240*	148,634*	2.69	137,078	6,442,515	47.0	840,617	645,511	7,554,520	205
1933	55,811*	141,956*	2.54	127,083	5,745,151	44.9	1,239,355	883,019	8,137,233	178
1934	53,966*	132,240*	2.45	129,913	5,568,454	42.8	1,346,307	1,120,090	5,384,834	...
1935	59,932*	178,041*	2.97	174,156	6,926,439	39.7	1,817,875	1,073,406	5,949,393	205
1936	63,385*	195,944*	3.09	176,505	6,853,058	38.8	1,819,581	1,444,877	8,168,250	382

* Includes' farmers canes.

21. The sugar crop for 1936 amounted to 195,944 tons, a marked increase on the record output of 178,041 tons in 1935. Of the 69,235 acres under cane 63,385 were reaped during the year, 61,421 on the sugar estates and the remainder in cane-farming areas. The general yield was 3.09 tons of sugar per acre, that on estates 3.12 tons per acre. This record yield per acre is now nearly 100 per cent. greater than it was in the ten-year period prior to 1927.

22. The weather was satisfactory for the 1936 crop but the uneven distribution of the rains is expected to have a deleterious effect on the spring grinding of 1937 which may be short, especially in those areas where irrigation facilities are not adequate.

23. The average f.o.b. price received for 96° sugar during the year was returned by the Customs Department as approximately $39 per ton and was lower than the average price of 1935. Reference has already been made to these low price levels; nevertheless towards the end of the year the market was showing definitely "bullish" tendencies. Not only did the position of world stocks tend to improve, but there were clear indications that world consumption was increasing—due no doubt to renewed industrial activity. A further improvement in the outlook was induced by a growing policy on the part of European countries to accumulate supplies against the dangers of war, but, on the other hand attention should be drawn to another factor which is not of major importance, but which is opposite in effect, in the stiffening of freight rates which, to a small extent, must have an unfavourable effect on the outlook.

24. Statistics, kindly supplied by the sugar estates, show that Diamond 10 and P.O.J. 2878 are rapidly replacing D. 625. While the acreages under both Diamond 10 and P.O.J. 2878 show marked increments, the latter has, of late been extended at a proportionately more rapid rate than the former, as will be seen from the data in Table III, which do not include acreages in mixed and other varieties.

TABLE III.

AREAS UNDER D. 625, DIAMOND 10 AND P.O.J. 2878.

Year.	Variety.		
	D. 625 acres.	Diamond 10. acres.	P.O.J. 2878. acres.
1933	32,964	5,563	...
1934	32,703	8,796	746
1935	32,429	13,303	2,763
1936	28,552	18,850	6,214
1937	21,380	23,700	12,427

25. *Cane-farming.*—This industry, which is of considerable importance to the villagers on the East Coast of Demerara, continues to expand. The output of sugar from farmers' canes during the past seven years is given below :—

1930	... ...	1,625 tons.
1931	... ...	1,631 „
1932	... ...	2,047 „
1933	... ...	2,328 „
1934	... ...	2,122 „
1935	... ...	3,344 „
1936	... ...	4,115 „

Rice.

26. The area occupied by rice during 1936 was 51,041 acres but, including the spring crop, the area actually reaped was 62,856 acres. The yield was returned at 60,580 tons padi, which is equivalent to 36,348 tons rice. The amount of rice exported was 20,559 tons with a value of $810,318, as against 10,565 tons with a value of $473,086 for 1935, the lowest year on record since 1927.

27. Table IV gives particulars of rice production and exports during the period 1927–1936.

TABLE IV.

RICE ACREAGES, PRODUCTION AND EXPORTS, 1927–1936.

Year.	Area Reaped (Spring and Autumn Crops) English Acres.					Yields.		Exports.		
			Essequibo.		British Guiana total acreage (reaped).			Rice.		
	Berbice.	Demerara.	Mainland	Islands		Padi tons.	Rice tons (60% yield of cleaned Rice from Padi)	Tons.	Total Value in dollars.	Value per ton in dollars.
1927 ...	20,182	14,507	13,240	5,123	53,052	59,748	35,848	11,497	723,871	62·9
1928 ...	22,028	17,886	12,356	6,182	58,452	61,144	36,686	18,083	1,114,147	61·6
1929 ...	28,121	20,962	11,023	6,636	66,742	72,096	43,257	14,091	876,407	62·1
1930 ...	26,689	18,399	10,786	7,608	63,482	64,252	38,551	22,480	1,090,385	48·5
1931 ...	29,217	34,955	10,445	8,875	83,492	78,424	47,054	23,632	1,060,339	44·8
1932 ...	29,218	37,275	12,556	8,892	87,941	84,783	50,869	28,541	1,187,871	41·2
1933 ...	27,120	37,696	13,197	9,112	87,125	63,524	38,154	29,120	1,062,470	36·4
1934 ...	24,990	31,213	6,638	8,110	70,951	55,112	31,067	14,700	583,090	39·6
1935 ...	32,971	32,713	10,054	7,828	83,566	85,522	51,313	10,565	473,086	44·7
1936 ...	23,125	21,086	10,564	8,081	62,856	60,580	36,348	20,559	810,318	39·4

It will be appreciated that these figures are approximations, it being extremely difficult to secure accurate figures for a crop cultivated under such varying conditions and subject to so many risks of one kind or another.

28. The 1936 season was not a favourable one for rice, excessive rainfall during the planting period followed by a prolonged spell of dry weather caused a reduction in the acreage finally reaped, while in some districts almost the entire autumn rice crop was lost. This was particularly severe on the West Coast, Berbice, and the

Upper East Coast, Demerara, where a large acreage was destroyed. The steady improvement in the quality of padi grown has been maintained, and it was interesting to note that the pure line seed padi No. 79 stood up well under the adverse weather conditions.

29. There was a considerable improvement in the export of rice during 1936, as compared with 1935, and there does not appear to have been very much old crop rice carried forward at the end of the year. Drought conditions which caused widespread losses in the creek districts reduced the estimated yield for the autumn crop by some 5,000 tons and it seems possible that the exports for 1937 may show a decline.

30. The price of Burma Long Grain rice has improved and at the end of the year it stood at 10/6 per cwt. but a certain amount of business was done with the West Indies in September at 8/4½ which is equivalent to $2.87 per bag of 160 lb. and $3.18 per bag of 177 lb. The market for Milled Seta Patna, a high grade Calcutta rice, has been firm throughout the year.

31. Unfortunately, owing to the fact that the Colony's principal markets made heavy purchases from Burma at the time of the Italo-Abyssinian War, at the end of 1935, the market for Demerara rice was not as easy as might have been expected.

32. The quality of the lower grades of rice milled from the autumn crop was good. It is to be hoped that with the aid of the work of the Department in distributing pure line seed, with greater discrimination on the part of the millers between good and bad padi, and with care on their part to see that the best seed is planted, this improvement will be maintained.

33. The industry has undoubtedly suffered because exporters have failed to act together in handling the problems which have arisen on the West Indian—the main purchasing—markets. Until a common policy is agreed and acted upon, the Colony's rice on export markets will continue to face serious competition with itself. The logical organisation would appear to be a single selling unit of some type through which all orders would pass and from which all price quotations would issue. Conflicting interests have thus far prevented any such action being taken, the nearest approach being a group selling project which was initiated during the year. Whatever criticisms may be levied at this undertaking, there is little question that this move towards orderly disposal did much to placate the Trinidad dealers who at the time had large stocks of Indian rice. Local exporters frequently lose sight of the doubly effective value of methodical shifting; withholding shipments at one time can be used as a gesture of goodwill while benefitting buyers and sellers alike; releasing or threatening to release large shipments can be used as a most effective weapon when West Indian importers are vacillating between placing rice orders with British Guiana or with the East.

34. With regard to the future control of the export trade, a committee to consider and report on the matter has been appointed by the Governor with wide terms of reference, including investigations into the working of the existing Ordinances and recommendations for improvements. The terms of reference are as follows:—

(1) (*a*) Whether a Rice Marketing Board should be retained, if so,
(*b*) how should the Board be constituted; and
(*c*) what should be its (i) functions, (ii) powers.

(2) (*a*) Whether grading for export should be statutorily compulsory and, if so,
(*b*) how the grades should be constituted.

(3) Whether the Rice Factories Ordinance
(*a*) requires amendment and, if so, in what respects;
(*b*) is being administered effectively and, if not, in what respects.

(4) (*a*) Whether Government control of prices at which padi may be bought from the grower could be administered successfully and with economic advantage to the industry, the cost of instituting and maintaining such control being borne by the industry and, if so,

(*b*) what should be the method of control;

(*c*) what administrative machinery (*e.g.*, staff and statutory powers) would be necessary to effectuate such control;

(*d*) what would be the initial annual cost of introducing and maintaining such control.

(5) (*a*) Whether a single selling organisation should be set up by legislation which would require all sales of rice and padi exported from the Colony to be made by or through that organisation and, if so,

(*b*) what form that organisation should take and how it should be financed; and

(*c*) whence would the capital requisite for financing annually the growing crop be obtained.

(6) Any other matters pertaining to the welfare of the rice industry.

35. Table V gives particulars of rice exported during 1936 according to grade.

TABLE V.

AMOUNT OF RICE GRADED IN BRITISH GUIANA—1936.

Months.	Whole Grain Super.	Super.	No. 1 Extra.	No. 1.	No. 2.	No. 3.	White Rice.		Super Broken.	Broken.	Total.
							A.	B.			
	bags.	bags.	bags.	bags.	bags.	bags.	bags.	bags.	bags.	bags.	bags.
January ...	...	3,663	982	2,157	11,217	3,264	4	82	9	47	21,425
February ...	...	4,710	1,591	1,039	15,291	3,476	246	343	322	194	27,212
March ...	2	4,137	1,221	5,851	18,495	9,047	13	321	300	295	39,682
April ...	...	2,889	518	1,397	8,342	5,117	147	22	226	591	19,249
May ...	...	1,609	994	944	10,690	5,741	5	286	279	291	20,839
June ...	...	2,310	280	1,024	10,798	6,517	126	27	149	258	21,489
July ...	...	1,516	121	1,328	15,884	7,465	50	62	97	332	26,855
August ...	...	1,966	504	795	8,671	5,592	3	2	104	107	17,744
September ...	...	1,597	1,064	857	8,594	2,997	3	239	96	...	15,447
October ...	...	4,261	2,672	1,168	5,249	5,171	24	175	91	20	18,831
November ...	...	2,878	1,025	3,091	8,535	9,256	2	76	74	242	25,179
December ...	5	4,452	870	5,926	7,538	6,528	27	41	125	289	25,801
Total—bags ...	7	35,988	11,842	25,577	129,304	70,171	650	1,676	1,872	2,666	279,753*

* Equivalent to 20,559 tons.

Coconuts.

36. The area under coconuts in 1936 was 21,379 acres. The exports for 1936 were as follows:—Coconuts 1,914,169 valued at $24,755; copra 563 tons valued at $37,051; coconut oil 9,818 gallons valued at $4,191.

37. The control by legislation of copra products manufacture has been dealt with in previous reports. In view of its being found impossible to enforce the Copra Products (Sale and Manufacture) Ordinances No. 31 of 1933, and No. 23 of 1934, new legislation was introduced—The Coconut Products (Control) Ordinance, No. 36 of 1935—with a view to regulating the manufacture and sale of these products. Provision was made as previously for the constitution of a Copra Brokers' Board. There are still difficulties in the way of securing complete control with the result that illegal manufacture of edible oil products continues as a factor tending to vitiate the purposes of the Ordinance. Some improvement has been achieved and as a result also, Government revenue, from the excise tax paid by manufacturers of edible oil products in the Georgetown district, has increased. Due to more favourable prices, brokers were able to distribute, at the following rates, to copra producers during the year:—

March Quarter	...	...$2 42 per 100 lb.
June „	...	...$2 71 „ „ „
September Quarter	...	...$2 70 „ „ „
December „	...	...$3 20 „ „ „

38. The export price of copra which stood at £15 per ton at the beginning of 1936 rose rapidly towards the end of the year and reached £22. 17s. 6d. per ton in December. This fact coupled with increased consumption by the local mills—the Demerara Oil and Cake Mills being the principal purchaser—encouraged producers to make copra with the result that brokers received 1,873 tons during the year compared with 1,273 tons in 1935, an increase of roughly 50 per cent.

39. These increased activities would have shown still better results had the action taken against illegal manufacturers in country districts been more effective. These persisted in cutting prices to relatively low figures. Although the maximum prices at which edible oil and lard substitute may be sold have been raised from 92 cents per gallon and 11 cents per pound to $1.32 per gallon and 16 cents per pound respectively, the *bona fide* manufacturer has been unable to obtain more than 96 cents per gallon and 13 cents per pound for these products, despite the fact that as much as $4.25 per hundred pounds had to be paid for copra instead of the minimum price prescribed under the Ordinance of $3 per hundred pounds.

40. Table VI gives particulars of coconuts, coconut oil and copra during the period 1927–1936.

TABLE VI.

COCONUT ACREAGES, AND THE PRODUCTION AND EXPORTS OF COCONUTS AND ITS BY-PRODUCTS—1927–1936.

Year.	Acres under cultivation (English) acres.	No. of Nuts Exported.	Value in Dollars.	Copra Exported, tons.	Value in Dollars.	Coconut Oil Exported gallons.	Value in Dollars.
1927 ...	29,235	334,185	6,019	1,163	116,525	25,326	25,271
1928 ...	29,456	321,635	5,939	3,501	352,522	26,244	24,426
1929 ...	29,456	637,812	10,614	3,759	314,350	20,862	16,730
1930 ...	28,052	629,371	7,845	2,010	143,423	26,377	16,059
1931 ...	22,382	1,494,195	13,538	1,381	82,629	20,742	9,254
1932 ...	23,301	962,364	10,484	757	48,936	19,048	10,239
1933 ...	23,452	1,698,175	22,925	921	41,045	20,198	8,904
1934 ...	22,600	2,487,402	32,960	700	23,487	12,662	5,554
1935 ...	21,786	2,737,784	33,891	1,226	55,134	6,699	2,912
1936 ...	21,379	1,914,169	24,755	563	37,051	9,818	4,191

Coffee.

41. The area under coffee in 1936 was 3,512 acres. The exports were 167 tons of cured coffee valued at $15,626. The market possibilities of this crop have gone from bad to worse, and as a result Messrs. Garnett & Co., who owned the largest coffee interests in the North West District, have closed their factory there and to a large extent abandoned their plantations. Liberian coffee is the main type produced, and finds a market chiefly in the Northern European countries. The crop is the most important on the pegasse lands of the Colony.

42. Table VII shows the acreage, exports and values of this crop during the period 1927–1936.

TABLE VII.

COFFEE ACREAGES, EXPORTS AND VALUES—1927–1936.

Year.	Area cultivated (English) acres.	Exports.	
		Tons.	Total Value in Dollars.
1927 ...	5,546	192	68,844
1928 ...	6,201	410	137,933
1929 ...	6,212	405	104,135
1930 ...	5,363	164	22,400
1931 ...	4,899	355	33,582
1932 ...	5,800	470	69,436
1933 ...	4,630	510	79,594
1934 ...	4,217	317	47,238
1935 ...	4,051	210	23,849
1936 ...	3,512	167	15,626

Citrus.

43. The area under other citrus and fruit was 657 acres, exclusive of limes. The citrus industry is not a large one and areas show some vacillation as cultivations are sometimes abandoned while new areas may be taken in. There has, however, been a fairly substantial increase in the area planted to budded grapefruit and oranges. Many of these plantings have been carried out in order to replace seedling areas, so that increased acreages which might be anticipated from the distribution are not observable. With few exceptions, the trees are not given sufficient attention after they have been set out and promising cultivations are frequently taken over by weeds and bush growth.

44. The area under limes was 698 acres. The exports of concentrated lime juice for the year were 9,825 gallons valued at $2,422 as against 3,112 gallons with a value of $689 for 1935 and 732 gallons of essential oil of limes valued at $28,569 as compared with 597 gallons valued at $25,092 in 1935.

45. Table VIII gives statistics bearing on the citrus industry from 1927–1936.

TABLE VIII.

CITRUS ACREAGES, AND EXPORTS AND VALUES OF CONCENTRATED LIME JUICE AND ESSENTIAL OIL OF LIMES—1927-1936.

Year.	Limes (English) acres.	Other Citrus and Fruit (English) acres.	Concentrated Lime-juice Exported. Gallons.	Value in Dollars.	Essential Oil of Limes Exported Gallons.	Value in Dollars.
1927 ...	705	...	5,249	7,559	273	14,175
1928 ...	695	...	8,124	7,799	440	26,316
1929 ...	635	...	12,717	12,019	801	47,585
1930 ...	740	...	11,373	10,855	660	38,352
1931 ...	747	254	8,347	8,014	590	39,806
1932 ...	787	316	958	920	730	44,728
1933 ...	869	328	Nil	...	1,166	65,014
1934 ...	789	371	10,468	2,013	892	32,967
1935 ...	694	656	3,112	689	597	25,092
1936 ...	698	657	9,825	2,422	732	28,569

Vegetable Crops.

46. The area under ground provisions was 11,359 acres and showed a further reduction due to causes discussed elsewhere in this report under "Census Returns." In the Canals Polder area there was excessive rainfall during the year which adversely affected the provision crops, cassava being the main crop lost. The question of the exportation of plantains received the attention of the Department during the year, when an organised scheme for the export of this product was mooted with a view to stabilizing the trade, which at present is in the hands of small exporters. The question of establishing a suitable Central Agency or Plantain Export Association was still unsolved at the close of the year under review.

47. There is a continued improvement in the quality of fresh vegetables grown and in this connection the Department's seed supply and demonstration stations have been most helpful.

Cacao.

48. The area returned under cacao was 512 acres. The area shows a substantial decline, especially in the West Demerara District where cultivations have for one reason or another been neglected or abandoned. Nevertheless the crop has been extended in the North West District where Witch Broom does not occur. Very accurate figures are, however, difficult to secure.

49. Table IX shows the area under cultivation and the imports of raw cacao and prepared cacao from 1927–1936.

Table IX.

CACAO ACREAGES, IMPORTS AND VALUES OF RAW CACAO AND PREPARED CACAO—1927-1936.

Year.	Area cultivated (English) acres.	Cacao exported. lb.	Cacao—Imports.			
			Raw Cacao. lb.	Value in Dollars.	Prepared Ground. lb.	Value in Dollars.
1927 ...	1,322	none	10,874	1,663	155,565	29,860
1928 ...	1,265	,,	3,367	423	150,393	27,404
1929 ...	1,514	,,	4,834	539	119,134	19,722
1930 ...	1,514	,,	6,201	637	108,081	18,108
1931 ...	953	,,	9,624	800	121,961	18,250
1932 ...	791	,,	1,147	87	70,764	12,139
1933 ...	797	,,	163	18	109,092	15,187
1934 ...	812	787	3,832	279	106,201	16,033
1935 ...	843	none	4,166	273	115,746	16,930
1936 ...	512	,,	30	2	101,261	14,254

Tobacco.

50. Seed of selected varieties found to have given best results at the Department's Experiment Stations was distributed. This has been done for a series of years consecutively, but despite attractive prices and prizes offered, planting of this crop has undergone little expansion. It is too liable to suffer from the vagaries of the weather.

AGRICULTURAL ORGANISATIONS.

51. Sugar being the principal industry, the Sugar Producers' Association is a very virile body and considers all problems affecting that industry. There is a Cane-farmers' Association which deals with matters affecting the cane-farming industry, especially in its dealings with the sugar factories.

52. The Rice Association which was organised to represent the interests of the rice industry continues in existence. It is largely an Association of millers with a few exporters and might be expected to exercise a beneficial influence on the industry as a whole. Unfortunately its activities to date have not been very conspicuous.

53. The British Guiana Beekeepers' Association, on the Executive Committee of which is the Director of Agriculture and the Secretary of which is the officer-in-charge of beekeeping activities, continues to function actively. It is now accepted that the Association has to its credit a record of enterprise and useful service. The Association has represented the wishes of the industry to Government and was thereby instrumental in obtaining the introduction of legislation against promiscuous imports of honey, bees and beekeeping equipment. Standardised jars and labels have been introduced and honey-advertising campaigns staged.

54. The formation of a Cattle Owners' Association has been urged and although it is known that the subject has been discussed and that there is real need for such a Body, such an organisation has not yet come into being.

55. There are several small District Agricultural Societies but these are held together with great difficulty owing to the fact that members are unpunctual in the payment of dues.

56. District Agricultural Committees, with the Director of Agriculture as Chairman, are in operation in two districts. These meet periodically and discuss agricultural matters pertaining to the areas concerned. With the formation of an Advisory Board of Agriculture on which are representatives from the districts, there is now no great need for these Committees.

Livestock.

57. There is no material change to report in the methods of animal husbandry and no such change can take place until cattle owners realise the benefits to be obtained from renting grazing land for their animals. The majority of cattle owners leave their young stock and dry cows to fend for themselves on the heavily

over-stocked grazing areas, and the most they are prepared to do is to feed cows during their lactation period with cut grass and sometimes concentrates. For a number of years now the *intensive* system of management practised on the Stock Farm has been advocated but is viewed with disfavour by cattle owners, doubtless due to the low prices paid for milk. As it is useless to attempt improvements of pasturage without an assured drainage, the only practical improvement of conditions of coast cattle lies in the direction of limiting the number stocked in *intensively* cultivated areas. It is impossible to ignore the fact that the majority of cattle owners and land owners know what can be done, but none is willing to incur any expense. Legislation with enforcement of regulations is the only method by which pasturage and livestock can be improved on a large scale.

58. Improvement in dairy cattle is handicapped by the fact that the owners are mainly small cow keepers who own no land. Animals of improved breed cannot be placed on the overstocked grazing areas and the owners are faced with the difficult problem of obtaining cut grass. An essential and urgent requirement is that areas should be divided into paddocks for the segregation of the different classes of cattle and that the number of animals on them be strictly limited to the carrying capacity of the land. Admittedly, the problem is not an easy one as the outlay for drainage, fencing, etc., may prove beyond the resources of the small cattle owner.

59. A livestock trade committee with the following terms of reference was appointed in 1935 "to consider and advise on steps to be taken whereby the livestock trade of this country, both for internal and external consumption, can be stimulated." The personnel of the Committee was as follows:—

Director of Agriculture (Chairman).
The Comptroller of Customs.
The Hon. F. A. Mackey.
Mr. A. M. Fulton.
Mr. R. V. Evan-Wong.
Mr. I. McLean.
The Government Veterinary Surgeon.

The report of the Committee has been published as Sessional Paper No. 12/1936.

60. The chief recommendations of the Committee are :—

(1) That, since local pickled meat requires protection when there is a surplus of cheap subsidized foreign supplies, existing import duties be increased.

(2) That Prague salt and sodium nitrite for pickling purposes be admitted free of duty.

(3) That local freight rates on slaughter cattle, meat products and breeding stock be reduced.

(4) That meat meal, meat and bone meal, and organic fertilizers be manufactured to meet the potential demand in this country and in the neighbouring islands.

(5) That wire for fencing, serums, vaccines, dips, medicines and foodstuffs of high protein value which cannot be produced locally be admitted duty-free.

(6) That the weighing of all slaughter animals brought to Georgetown be made compulsory with a view to affecting more equitable sale transactions.

(7) That the coastal areas being over-stocked with animals of all ages, it is very desirable to dispose of the old stock (animals over four years). The only solution seems to be by securing export sales.

(8) That export of cattle should be controlled by a central organisation working on business lines.

(9) That a quota for cattle on the Trinidad and Barbados markets be sought.

(10) That breed of cattle and management practices need to be improved and in this connection the Veterinary Officer should be provided with adequate travelling to meet this.

(11) That, as development of ranching on the Rupununi Savannahs depends on communication with the coast, the trail be kept in good repair and be improved.

(12) That legislation be introduced to protect coastal owners from the dumping of Rupununi cattle on the local market.

(13) That Government land adjoining the Botanic Gardens and Rice Experiment Station be utilized for extending the existing livestock Division of the Department of Agriculture, with a view to breeding up beef bulls for distribution.

(14) That a breeding centre and agistment area under Government control be established in Essequibo to assist cattle raising in that area.

(15) That certain desirable legislation be introduced as early as possible.

61. Ordinance No. 29 of 1936, to make provision for the prevention of the spread of contagious and infectious diseases among animals, became operative during the year. The main features of this Ordinance are found elsewhere in the report under "Agricultural Legislation." It is hoped that the regulations made thereunder will be introduced during 1937.

SECTION II.

WORK OF THE DEPARTMENT OF AGRICULTURE DURING 1936.

62. There is given herein a brief resumé of the more important activities of the Department of Agriculture during the year, under the following heads;—

WORK OF THE DISTRICT STAFF:—

General; Pure line seed padi distribution; field competitions; Anna Regina Estates and Bush Lot Land Settlement; Census Returns.

RESEARCH AND EXPERIMENT:

Sugar; Rice; Citrus; Beekeeping; Minor Crops; Cacao; Seed and Plant Exchange; Seed and Plant Distribution; Botanic Gardens and Nurseries; Livestock; Chemistry; Plant Pathology and Botany; Entomology.

AGRICULTURAL EDUCATION:

School Gardens; Rural Science and Elementary Agriculture Courses; Field Days.

AGRICULTURAL ECONOMICS AND STATISTICS.

CO-OPERATIVE CREDIT BANKS.

ADVISORY BOARD OF AGRICULTURE.

PUBLICATIONS AND LIBRARY.

WORK OF THE DISTRICT STAFF.

General.

63. The Divisional Agricultural Officers are stationed in the Berbice, East and West Demerara, Essequibo and North West Districts, and the work undertaken in these several districts is usually given in detail in their annual reports which are published separately. Briefly, such work includes;—

(1) Field experimental work with the major crops (sugar and rice) in collaboration with the specialist officers concerned where such is carried on in their districts.

(2) The organisation of supplies and the distribution of seed padi through accredited padi farmers, and visits to such farms for instructional work at intervals.

(3) Rice Mill Investigations. In this connection an exhaustive survey was made during the year of over 200 rice mills and the conditions under which they operate. Figures were also obtained of rice stocks on hand during the year.

(4) District agricultural inspection and educational work at intervals.

(5) Experiments and demonstrations with various minor crops, distribution of planting material, etc.

(6) Supervision of agricultural stations, sub-stations, livestock centres, school gardens, field competitions, etc.

(7) Encouragement of the extension of areas suitable for fruit, notably citrus, as well as food and money crops supplementary to rice and ground provisions, e.g., green vegetables, peas and beans, papaws, etc., for all of which there is a ready local market.

(8) Collection and collation of agricultural census returns.

(9) Co-operative Credit Banks work.

(10) General extension and advisory work.

(11) Rice grading where such is required.

(12) Experimental banana cultivations and economic homestead units.

Pure line seed distribution.

64. The extension of pure line seed padi in the rice growing centres throughout the Colony continues to form one of the most important duties of the divisional agricultural staff. In addition to the establishment of experimental demonstration blocks and pure line seed farms, instruction is also given in rogning and mass selection in the field. During the year 326,400lb. of pure seed were distributed.

65. A system has been devised for checking the progress made in the quality of padi in the various districts, and as a result, it was found that with the exception of the West Coast, Berbice, pure line padi was now well established throughout the chief padi growing centres in the Colony. In the aforementioned area, however, the farmers are dependent on rainfall, and if the weather is unfavourable, seed is sometimes sown as many as three times before a satisfactory stand is obtained. Under such circumstances the seed sown is procured from whatever source is available, with the result that the crop harvested is a general mixture of all types. In consequence this particular district received special attention, and 410 bags of pure line and selected seed were distributed in this area. Unfortunately, however, these efforts were nullified by a prolonged drought which set in from the middle of July and totally destroyed some 3,000–4,000 acres which had been established almost entirely with pure line No.79. The padi had reached the flowering stage but the grain failed to mature. This was a heavy blow to the pure seed programme and it again emphasised the difficulties experienced in this work. It would not have been possible to supply a similar quantity of seed this year, but it is particularly gratifying to know that one of the chief local proprietors in this area, who had established a temporary irrigation system and so saved some 75 acres of pure line No. 79, has reserved the major part of this to supply the farmers' demands. The efforts made last year were, however, not without favourable results, as this year many of the farmers who usually obtain their padi seed on credit have deposited the value of the seed padi with the proprietor referred to, in order to ensure their requirements being obtained. On the Corentyne side, too, pure line No. 79 has become very popular, and last year when padi was at a low price immediately after harvesting, it was the only padi which could be readily sold at the mills. This, naturally, has had its good effect with the result that a larger increase in pure line plantings in that area during the next autumn crop is certain

66. The following table gives particulars of seed padi distributed during the year under review.

Pure Line Seed Padi Distribution—1936.

Number of Bags (140 lb.) distributed.

District	Pure Line Seed Departmental Stocks. BAGS.	Selected Seed Purchased. BAGS.
Berbice ...	130	500
East Demerara ...	418	...
West Demerara ...	45	40
Essequibo ...	477	333
Wakenaam and Leguan ...	266	...
Total ...	1,336	873

Field Competitions.

67. The usual field competitions—rice, ground provisions and coffee—were held during the year. The rice competitions in the three counties were confined to the pure line seed farms established, with the proviso that the area established and the seed reserved were to be sufficient to supply the growers' seed requirements for the following season. The coffee competitions were for the best exhibit of Liberian coffee of commercial standard, while the ground provisions were confined to the Pomeroon District for graded sweet potatoes. Money prizes were awarded to the various winners.

Anna Regina Estates and Bush Lot Land Settlement.

68. The Anna Regina Estates continued to be under the control of the lessee, Mr. Parikhan Rai, whose lease terminated at the end of the year.

69. The health of the Bush Lot settlers may be considered as normal for the year under review. Two crops of rice were grown this year. The spring crop was marred by bad weather but the autumn crop was a good one although at the commencement of the growing period bad weather was experienced. The crop was disposed of to a merchant in Georgetown.

70. A statement of the revenue collected from the Anna Regina Estates and Bush Lot Land Settlement is given hereunder ;—

Lease of Anna Regina Estates ...	$ 2,800 00
Bush Lot rents ...	1,535 43
Sale of scrap ...	801 17
Refund of advances ...	467 69
Interest on advances ...	51 99
	$ 5,656 28

Census Returns.

71. From a study of Table XI it will be seen that there has been a reduction in total acreage devoted to agricultural pursuits, rice being the principal crop involved. This reduction is attributed largely to the comparatively low prices for export rice and to the fact that a considerable area of the autumn crop plantings was lost. Not only did these low prices serve to discourage planting to maintain the rice acreages of the previous years, but they encouraged middlemen to keep larger stocks for the domestic trade and farmers in suitable areas to concentrate on cane-farming. With larger quantities of rice available for local consumption, smaller areas than normal were planted to other food crops. It has been suggested also that rice marketing control as relating to the export trade may exercise some unfavourable psychological influence on the rice planter. Further, breaches of considerable proportions in the coastal sea defence wall occurred with the result that extensive repair works were undertaken. Wages for such temporary employment must always, of necessity, be attractive. As the high prices for gold were

maintained there was an increased tendency for some of the male population—including farmers—to embark on this enterprise. Activity in the timber trade also offered its quota of attraction. These influences are always more observable when agricultural prices are low, but with a re-alignment of prices the small agriculturist usually returns to the land. It is unfortunate, however, that there is this attitude to sustained agricultural endeavour, but in fairness to the villager it must be stated that the conditions under which he labours are not so favourable as in many of the neighbouring Colonies where the cultivator resides on his plot and is not handicapped by abnormal drainage and irrigation problems.

72. Tables X and XI show the number of acres under cultivation during 1936 in the three counties of the Colony and also summaries for the period 1927-1936. Table XII shows the returns of livestock in the Colony for the year 1936.

Table X.

CROP ACREAGES IN BERBICE, DEMERARA AND ESSEQUIBO COUNTIES, 1936.

Counties.	Nature of Crops and number of Acres under cultivation on December 31, 1936. (English acres).								
	Sugar Cane.	Rice.	Coconuts.	Coffee.	Cacao.	Rubber.	Limes.	Other Citrus and Fruit.	Ground Provisions.
	Acres.	Acres.	Acres.	Acres.	Acres.	Acres.	Acres.	Acres.	Acres.
Berbice ...	26,374	23,125	3,557	4	151	...	498	364	2,816
Demerara ...	42,585	16,988	12,450	1,638	163	82	...	178	6,298
Essequibo ...	276	10,928	5,372	1,870	198	51	200	115	2,245
Total ...	69,235*	51,041†	21,379	3,512	512	133	698	657	11,359‡

* Includes area under farmers' canes—2,711 acres.
† Does not include the acreage for the Spring Crop—11,815 acres—which is grown on the same land.
‡ See discussion above regarding this decrease.

Table XI.

SUMMARIES OF CROP ACREAGES—1927-1936.

	Year.	Annual Summaries of the acreages under cultivation during the years 1927-1936 together with th acreages reaped for the same period for sugar-cane and rice.* (English acres).											
		Sugar-Cane.		Rice.		Coconuts.	Coffee.	Cacao.	Rubber.	Limes.	Other Citrus and Fruit.	Maize, Plantains, etc., and Ground Provisions.	Total area under cultivation.
		Area cultivated.	Area reaped.	Area cultivated.	Area reaped.								
British Guiana	1927	59,271	56,534	39,283	53,052	29,235	5,546	1,322	1,895	705	...	14,576	151,833
Do. ...	1928	57,625	53,489	46,667	58,449	29,456	6,201	1,265	1,683	695	...	16,336	159,928
Do. ...	1929	57,247	56,126	55,745	66,742	29,456	6,212	1,514	1,474	635	...	14,283	166,566
Do. ...	1930	57,244	54,264	52,287	63,482	28,052	5,363	1,514	1,474	740	..	14,312	160,986
Do. ...	1931	61,097	54,999	77,478	83,492	22,882	4,899	953	827	747	254	17,575	186,712
Do. ...	1932	62,905	55,240	73,453	87,941	23,301	5,800	791	880	787	316	17,135	185,368
Do. ...	1933	63,093	55,811	72,161	87,125	23,452	4,630	797	681	869	328	16,635	182,646
Do. ...	1934	61,567	53,966	63,227	70,951	22,600	4,217	812	873	789	371	16,450	169,906
Do. ...	1935	67,914	59,932	70,882	83,566	21,786	4,051	843	679	694	656	13,246	178,544
Do. ...	1936	69,235	63,385	51,041	62,856	21,379	3,512	512	133	698	657	11,359	158,526

Table XII.

LIVESTOCK RETURNS, 1936.

County.	Horned Cattle.	Horses.	Mules.	Asses.	Buffaloes.	Sheep.	Goats.	Swine.
Berbice	38,580	658	439	3,589	...	17,421	7,244	10,694
Demerara	31,898	477	736	1,649	58	6,911	3,077	9,624
Essequibo	6,488	27	34	719	37	1,617	965	1,854
Hinterland Savannahs ...	54,671	1,655	16	7	...	361	55	308
Total	131,167	2,817	1,225	5,962	95	26,310	11,341	22,480

RESEARCH AND EXPERIMENT.

Sugar.

73. The following members formed the Sugar Experiment Stations' Committee for the year :—

Director of Agriculture—Chairman.
Mr. J. C. Gibson —Pln. Port Mourant, Berbice.
Mr. G. M. Eccles —Pln. Blairmont, Berbice.
Mr. J. Bee —Pln. Albion, Berbice.
Mr. R. E. Rhodes —Pln. Diamond.
Mr. A. Murison —Pln. Uitvlugt.
Hon. M. B. G. Austin—Messrs. Curtis Campbell & Co., Ltd., Georgetown.

Mr. H. F. Chapman, of Pln. Bath, Berbice, acted for Mr. Eccles during his absence from the Colony.

74. Eight cane varieties were imported during the year *via* the Central West Indian Quarantine Station at Trinidad. Some of the recent introductions mentioned in the last report have made very satisfactory growth.

75. Of the 1936 seedlings, 17,736 were basketed in clay and 5,384 in pegasse soil. The former will undergo their early selections at the Sugar Experiment Station on frontland soil, the latter at Pln. Leonora on pegasse soil. Thanks are due to the authorities of Pln. Diamond for kindly supplying the pegasse soil for the baskets and to those at Leonora for the land, etc., allocated at Cornelia Ida.

76. Of the 19,898 basketed seedlings of the 1935 group, 12,503 were transplanted to frontland soil at the Sugar Experiment Station and 2,902 to pegasse soil at Pln. Uitvlugt through the courtesy of the estate authorities.

77. The 1934 seedlings have undergone two selections as yet. Of 24,147 basketed and 18,132 transplanted to the field, 52 remain for multiplication and further testing.

78. Rigid selection has reduced the number of 1933 seedlings to 50, of which half are in at least one replicated test. Some of these show considerable promise.

79. Among the seedlings bred prior to 1933 only 64 remain under trial and multiplication, and 28 of these were bred in 1930, a year which yielded many promising seedlings and very useful parents for further breeding.

80. Forty-six variety trials were reaped during the year. It is now established that P.O.J. 2878 and Diamond 10 are superior to D. 625 not only as plant canes but also as first and second ratoons. Co. 213 has done well in the tests, both on frontland and on pegassy soils, and certain estates have made preliminary commercial plantings. It is deserving of more extended field trials. Extensions have also been made of certain 1930 seedlings which have given good plant cane results but for which little or no ratoon data are as yet available.

81. Twenty-three manurial trials were reaped during the year. They indicated that second ratoons of D. 625, growing on flood-fallowed frontland, should receive 4 cwt. of sulphate of ammonia per acre. It was also established for P.O.J. 2878, growing on flood-fallowed frontland, that plant canes should receive 2 cwt. per acre of sulphate of ammonia, first ratoons 6 cwt. per acre and second ratoons 4 cwt. per acre. In the case of the first ratoons, however, the margin of profit of a 6 cwt. over a 4 cwt. application is small and in general a 4 cwt. application may prove more practicable. First and second ratoons Diamond 10, growing on the same soil type should both receive 4 cwt. of sulphate of ammonia per acre.

82. Other investigations which are proceeding include irrigation-manurial trials, flood-fallowing trials, trials with potassic and phosphatic fertilisers, trials with

nitrogenous fertilisers other than sulphate of ammonia. studies in methods of refractometer sampling, cane growth, etc. Soil problems, such as acidity, are also receiving careful study and further reference to this work is dealt with under chemistry.

83. The flood-fallowing investigations are hampered by restricted facilities; trials are expensive to lay down. From the two trials reaped, taken over three crops, the indications are:—

(*a*) that water should be held at a minimum of 12 inches deep;
(*b*) that the addition of molasses to the flood-water or the sowing and encouragement of floating vegetation is a profitable modification;
(*c*) that limestone should be applied before flooding;
(*d*) that the longer the period of flooding the more prolonged the residual beneficial effect.

The estates are urged to co-operate generously in these investigations by establishing a number of trials so that the economics of flood-fallowing may be thoroughly studied.

84. Cane growth studies have shown that:—

(1) the rate of stalk elongation is largely a function of age and the general shape of the growth rate curve is not generally altered by fluctuations in the water supply;
(2) cane formation appears to cease after ten months of age, no appreciable increase in tonnage taking place after that date;
(3) maximum sucrose storage takes place side by side with maximum cane formation;
(4) the number of stalks per acre is not necessarily indicative of the yield of cane and it is unsafe to attempt an estimate of yield based on early tiller counts.

Full details of the sugar-cane experimental work can be obtained from the Sugar Bulletins which are published annually.

Rice.

85. An appreciable part of the breeding programme was devoted to the selection work on existing varieties, high yielding strains with good milling qualities being selected and grown in pure stands. In consequence, not only is the outlook promising in regard to new varieties but those already in existence are giving better results in yields and marketing qualities. Special attention is being paid to long grain rices. The following varieties are of interest in this connection:—D. 88, D. 91, D. 92 and D. 228. While most of them are equal to Demerara Creole in length they do not possess that objectionable curve in the grain and which is often responsible for high breakage in milling. The total number of varieties tested at the Georgetown Experiment Station, including imported varieties and selections from local cultivations, was 185.

86. Unfortunately, this work is likely to receive a setback following the resignation of the Plant Breeder who had been continuously engaged on these problems during the last five years.

87. During the year, fourteen variety padi trials were laid down including seven standard trials containing the same varieties and seven trials with new varieties (with No. 79 and Blue Stick as cont rols). The sites of these experiments were:—

Berbice	...	...Whim Experiment Station and No. 63, Corentyne.
Demerara	...	...Georgetown Experiment Station. Hope, East Coast. Vreed-en-Hoop, West Bank.
Essequibo	...	...Henrietta Experiment Station. Affiance. Wakenaam.

88. In regard to the standard variety trials the following conclusions may be drawn:—

(*a*) Blue Stick, the widest grown variety on the Essequibo Coast, proved best in both trials in that area. At Henrietta it was significantly better than all the other varieties tried except No. 79.

(*b*) On the island of Wakenaam, No. 79 definitely outyielded all varieties except D. 114 and D. 110.

(*c*) At Vreed-en-Hoop, D. 114 gave a significantly higher yield than any of its competitors.

(*d*) At Georgetown, D. 110 was first, followed by D. 114, there being no significant difference between the yields. Both these varieties proved statistically superior to all the others tried.

(*e*) At Hope, there was no significant difference between the yields of D. 114, D. 110, Blue Stick and No. 79. D. 114 was, however, statistically superior to the other four varieties tested.

(*f*) D. 91, which was a failure in the other trials, was first at Whim but not significantly better than D. 110, Demerara Creole or Kalyaman. D. 114 did very poorly in this trial.

(*g*) Considering the combined results for the Colony as a whole, it is clear that while D. 110 and D. 114 are significantly better than D. 91, Demerara Creole and No. 75, there is little to choose between the first four varieties on the list, viz., D. 110, D. 114, Blue Stick and No. 79.

89. The results obtained since 1930 are summarised as follows:—

No. 79.—This variety is increasing in popularity throughout the country, its attractive qualities being: it is a good yielder; of all the commercial varieties grown locally it is more resistant to drought conditions; there is little tendency to lodge or shatter in the field; it has excellent milling qualities—yielding a rice very similar to Blue Stick. It was first in two out of the three trials in which it appeared in 1930. In 1931 it was first in the two trials in which it was included. A similar thing occurred in 1932 when it was first in three trials. In 1933 it appeared in three experiments and headed the list each time. In 1934 this variety was tested thrice, coming first in one trial, second in another and last in the third. With a single exception, all of the trials just mentioned were located in Demerara and Essequibo. In 1935 No. 79 failed in two trials in Berbice but was more satisfactory in Demerara and Essequibo leading Demerara Creole and Blue Stick (the standard) in five out of six trials. In 1936 it was ahead of Demerara Creole in ten out of twelve trials in which they occurred together, but only outyielded Blue Stick in four out of ten trials. This variety possesses a medium length grain and is particularly well suited to cultivation in this Colony.

Blue Stick.—There was little to choose between this variety and the standard (Demerara Creole) in the three trials executed in 1930, but the yield from the latter was slightly more favourable. In 1931 it was inferior to Demerara Creole in Demerara but superior in Essequibo. It occcurred in one trial (Essequibo) in 1932 and gave a higher yield than Demerara Creole. Tried three times in 1933, this variety led Demerara Creole on each occasion. In 1934 it outyielded Demerara Creole in both the trials in which they appeared together. In 1935 Blue Stick was better than Demerara Creole in five out of the eight trials in which they appeared together. In 1936 it was superior to the standard in six out of the eight tests. This variety possesses a medium length grain. Unfortunately, it has to be reaped at an early stage in maturity if excessive shattering is to be avoided.

Demerara Creole.—This variety was third in two out of the three trials conducted in 1930. In 1931 it was third in one of the two trials in which it appeared there being no significant difference between its yield and that of two varieties whose yields were superior. It occurred in two trials in 1932 but was outstanding in neither; in 1933 it appeared in three experiments and was fourth in two and

fifth in one. In the 1934 trials its record did not improve, being fifth in two experiments and seventh in one. In one trial in 1935 a pure line selection came second, but in the nine other experiments in which it occurred the yields obtained were relatively poor. In 1936 it appeared in twelve trials, being second in one and third in two and was outyielded by No. 79 in nine out of these twelve trials and by Blue Stick six times out of eight trials in which they appeared together. It is a long grain type and although surpassed in yield by several varieties it still enjoys a fair measure of popularity, notably in East Demerara, where it is favoured by some growers for supplying a special demand.

D. 114.—This variety appeared in a trial first in 1934 and was second in order of merit with no significant difference between its yield and that of Lead Rice which came first; its yield was significantly higher than those of Demerara Creole and No. 79. In 1935 it occurred in six experiments with Demerara Creole, Blue Stick and No. 79, was first once, second twice, third once and fifth twice, leading Demerara Creole in six trials, Blue stick in four and No. 79 in three. In 1936, it appeared in thirteen trials and was first four times, second four times and third twice; it was tried ten times with Blue Stick and was superior six times, thirteen times with No. 79 and was superior eight times, eleven times with Demerara Creole and superior ten times. This variety is a Carolina type, medium to long grain and plump.

D. 110.—This variety was first tried in 1935 in one experiment, when it yielded higher than Demerara Creole, Blue Stick and No. 79; in 1936 it appeared in eight trials with D. 114, No. 79 and Demerara Creole, was first in two, second in two and third in one, giving higher yields than D. 114, three times, than No. 79 four times, than Demerara Creole eight times. It occurred in seven trials with Blue Stick, with superior yields on four occasions. This variety is a Carolina type, medium to long grain and plump.

90. In addition to the variety trials, a number of experiments designed to investigate the use of fertilisers and variations in planting practice were also carried out. Attention has been called, in previous reports, to the gradual decrease in yield experienced in areas continuously planted to padi. This gradual decrease in fertility appears to be due, in part, to lack of plant nutrients in available form since, in all the experiments on low-yielding areas, manurial treatments have caused definite improvements in yield. A further problem concerns the reasons why certain areas in the Colony give heavy padi yields which cannot be duplicated in other areas under any system of treatment so far known.

91. The nearest approach to a solution of these problems was obtained when applications of fertilisers were applied to a few plots which had received dressings of green manure seven months earlier. Yields equivalent to 5,000 lb. per acre were obtained on such plots.

92. In consequence of this indication a definite experiment was initiated to test the effect of such treatments. The first year's crop (Agri. Jour. B.G., VII, No. 2, pp. 105–6) indicated the effects of applications of green manure. The second crop, planted a year later, was designed to measure the effect of subsequent dressings of artificial fertilisers to plots originally receiving green manure. In this second crop the orginal dressings of green manure, green manure and artificial fertilisers and artificial fertilisers alone, had no residual effect. The application of artificial fertilisers to the second crop on plots which had originally received green manure gave an increased yield. The increase was, however, no more than might have been expected from the artificial fertilisers alone. In this case, where the artificial fertilisers were applied twelve months after the green manure, no striking yield increases were obtained. There is no doubt that, under certain conditions, green dressings followed at a suitable interval by applications of artificial fertilisers, are responsible for heavy yields. Experiments with different kinds of green dressings

and with varied time intervals between the application of green manure and of artificial fertilisers will, therefore, be continued.

93. Three *ad hoc* experiments—two concerned with the immediate and residual effects respectively of applications of final molasses, the third involving small dressings of animal droppings—showed in the first two cases uneconomic returns and in the other ineffective results.

94. To sum up, while the increases in yield from various treatments have been, in some cases, quite marked, generally speaking—as far as can be judged at present—when rice prices are low, fertilisers or other application is not likely to receive serious attention in practice. Nevertheless, the more outstanding results obtained when a green manure is followed in a subsequent crop with an artificial dressing are of considerable practical interest in areas where two crops of rice per annum are grown. Examination of soil samples from the sites of variety trials with padi have suggested positive correlation of yield with the organic matter content. This suggested relationship will be followed up.

Citrus.

95. Distribution of budded plants was continued. Orange plants are in greater demand as the local market for this fruit is better than for grapefruit.

96. Another good crop of Marsh grapefruit was borne by the experimental orchard at Hosororo, North West District. Small sample shipments have been sent to Covent Garden but the results to date are not very encouraging. These trials will be followed up. It is probable that the fruit from older trees will be more satisfactory in size, appearance and flavour. Large, thick skinned fruit are not favoured on the export market. It is not improbable that the main outlet for locally grown fruit will be as canned produce.

97. Table XIII indicates the distribution of citrus plants during the period 1935–1936 ; the total distribution from 1928–1936 amounted to 33,342 plants. This does not take into account plants raised in private nurseries.

TABLE XIII.

DISTRIBUTION OF CITRUS—1935-1936.

	Demerara.		Berbice.		Essequibo.		North West District.		Total Distribution.		Total Distribution, 1930–1936
	1935.	1936.	1935.	1936.	1935.	1936.	1935.	1936.	1935.	1936.	
Budded Oranges ...	73	367	43	141	11	177	134	...	261	685	6,192*
,, Grapefruit ...	72	231	37	68	6	156	197	...	312	455	5,577*
,, Limes ...	...	82	...	...	...	...	100	...	100	82	4,586
Seedling Limes ...	...	...	...	...	...	...	...	...	...	...	16,485
Total ...	145	680	80	209	17	333	431	...	673	1,222	32,840

*During 1928 and 1929 a total of 502 budded oranges and grapefruit were distributed but not listed separately, making a total of 33,342 plants.

Bee-keeping.

98. The demand for Italian queens continues to make it necessary for the Department's Demonstration and Queen-breeding Apiary to concentrate mainly upon the production of queens. During the year, 153 queens (including nine replacements) were distributed, compared with 102 in 1935, 92 in 1934, and 53 in 1933, Ten nucleus hives with queens were distributed to persons desiring to start beekeeping or strengthen their apiaries.

99. The observation of a number of scale hives continues, weights being taken daily and increases or decreases recorded. The scaled hives are situated at the Demonstration Apiary and it would seem that on account of the large number of nucleus hives in the vicinity, the locality is being somewhat overcrowded. It is,

therefore, probable that even more informative results will be obtained if and when provision can be made for these observations to be conducted in an out-apiary.

100. The extension work, in close collaboration with the British Guiana Beekeepers' Association, continued to give encouraging results. Plans were in hand at the end of the year for staging another major honey-advertising campaign.

101. A good honey crop was collected during the year and once again the export trade began to be considered seriously.

102. Legislation, calculated to ensure precaution against the introduction of bee diseases, began to be enforced during the year.

103. On April 6, a lantern lecture on "Beekeeping" by the Officer-in-Charge of the beekeeping activities, was given to a large audience at the Government School, Georgetown.

Minor Crops.

104. Minor crop improvement was carried out in the same direction as mentioned in previous reports. The crops worthy of mention are bananas, plantains, mangoes, papaws and pears while the work on cassava varieties continues. Distribution of tobacco seed of the heavier types was maintained. Selected farmers received seed of quick growing leguminous crops—black eye peas, bush bonavist, dwarf bonavist—which might prove useful as a cover crop in some cases and a cash crop in others. Planting material of the various fodder crops were supplied to stock owners in keeping with the pasture improvement policy.

Cacao.

105. The remaining marked tree, at Middlesex, No. 2 Canal, West Bank, Demerara, which had been under observation for some years, being apparently free from Witch Broom, was severely pruned early in the year. Upon inspection a few months later, it was found to be infected with Witch Broom. Its previous apparent immunity was probably due to the fact that there were very few other trees in the immediate neighbourhood.

106. In view of the reported existence in the Rupununi of a 'Wild Cacao' indigenous to the Guianas and immune to Witch Broom disease, an effort was made to secure pods for propagation and study at Headquarters. There was delay in transit, the pods arrived in poor condition and efforts made to germinate the seed were unsuccessful. Attempts have since been made to secure more pods but without success; the great drawback is distance with lack of quick transport.

107. There was a further small demand for cacao plants during the year from farmers in various parts of the Colony.

Seed and Plant Exchange.

108. The Department is again indebted to Mr. David Barry of Los Angeles and the Coconut Grove Palmetum, Florida, for a number of new species of palm seed, etc; seed of two new palm species was also obtained from the Federated Malay States. A number of peas and beans were obtained for trial, including four varieties of Adzuki bean from the United States Department of Agriculture, Cluster bean from India, Tepary bean from South Africa and Mauritius Pea from Trinidad. With the exception of the Cluster bean, however, these legumes did not prove very well suited to local conditions. The Christophene was again given a trial, with seedlings obtained from Trinidad, but proved difficult to establish. On the other hand, the Glovel Tomato obtained from Florida proved a useful introduction. A good selection of plants and cuttings of ornamentals, including some new varieties of canna, were obtained from the Hope Gardens, Jamaica, and a large consignment of seed of ornamental trees, shrubs and climbers was received from the Royal Botanic Gardens, Peradeniya; seeds of ornamentals, together with some

orchids were obtained from Trinidad. A number of ornamentals were also received from Pretoria and Natal. Some varieties of Maize and Mustard from Messrs. Sutton's India House did not prove suited to local conditions, but Early Scarlet Tomato from the same source was successful. Red fleshed papaw was received from the Canal Zone Experiment Gardens and Nanksoy 332 Soyabean from China. Some deep water rices were received from the Agricultural Department, Sierra Leone, while the Instituto Agronomico do Estado de S. Paulo, Brazil, through Dr. S. C. Harland also sent twenty-six varieties of this cereal. Haricot beans and petit pois from Martinique failed. Seed of the Bukoba variety of *Coffee Robusta* was obtained from Tanganyika, but failed to germinate. A plant of Panchoi Pear was received from the Department of Agriculture, Trinidad, and a quantity of ornamental and vegetable seeds were obtained by exchange from Messrs. Vilmorin Andrieux et Cie, of Paris. All plants and seeds received were listed regularly in the Agricultural Journal.

Plant and Seed Distribution.

109. The following is a list of the planting material distributed locally by the Department during 1936, and the total distributions from 1928–1936.

Field and Garden Crops.	Distribution 1936.	Total Distribution 1928–1936.
Sugar Cane	...509,600 cuttings	2,376,578 cuttings.
Padi (Seed)	...187,040 lb.	1,394,109 lb.*
„ (seedlings)	... ...	260,000
Plantains	... 20 suckers.	4,143 suckers.
Bananas	... 80 „	10,340 „
Papaw (seed)	... 10 oz.	9 lb.
„ (seedlings)	... 115	3,855
Grape Vine	... ...	220
Tobacco (seed)	... 1 lb.	24¾
„ (plants)	... ...	1,652
Legumes (Cover Crops)	... 84 lb.	2,042 lb.
Peas and Beans (Edible)	... 221 lb.	2,591 lb.
Soya Beans	... ...	495¾ lb.
Fodders (Various)	... 10,000 cuttings.	70,276 cuttings.
„ „	... 600 tops.	600 tops.
„ „	... 1,000 plants.	1,000 plants.
Onion (seed)	... 22 lb.	435 lb.
„ (seedlings)	... 4,104	123,775
Tomato (seed)	... 2 lb.	20¾ lb.
„ (seedlings)	... 2,084	20,046
„ (cuttings)	... ...	92
„ (fruit)	... 500	1,164
Ground Nuts	... ...	406 lb.
Sorghums	... ...	50 lb.
Eschallot	... 12 lb.	37¼ lb.
Cabbage (seed)	... ...	7¾ lb.
„ (seedlings)	... 60	922
Jerusalem Artichoke	... ...	238 lb.
Indian Kale	... ...	230 suckers.
Boulanger (seed)	... 1½ lb.	2 lb.
„ (seedlings)	... 312	444
Ginger	... 20 lb.	23¼ lb.
Sweet Corn	... ...	2¾ lb.
Broom Corn	... ...	74 lb.
Jute	... ...	3 lb.
Vegetable Seed (Assorted)	... 29¾ lb.	56¾ lb.

*Exclusive of 801,780 lb. distributed from 1934–36 for flood and drought relief measures.

Field and Garden Crops.	Distribution 1936.	Total Distribution 1928–1936.
Chilli (Seed) ...	...	96 lb.
„ (seedlings) ...	...	2,396
Sweet Potato (cuttings) ...	74,000	274,695
„ „ (tubers) ...	300 lb.	318 lb.
„ „ (No.) ...	...	11,110
Cassava ...	100 cuttings.	21,170 cuttings.
Ground Provisions (Eddoes, Tannias, Dasheens and Yams) ...	4 lb.	1,210 lb.
Pineapple ...	...	472 suckers.
Krowa ...	...	37 „
Orchard Crops.		
Citrus (budded) Oranges ...	685 plants.	6,192 plants.
„ „ Grapefruit ...	455 „	5,577 „
Limes (budded) ...	82 „	4,586 „
„ (seedling) ...	...	16,485
Coffee (Arabian) ...	..	1,438 seedlings.
„ (Liberian) ...	9 seedlings.	12,371 „
Cacao ...	449 „	8,381 „
„ (pods) ..	158	258
Mangoes (Grafted) ...	167 plants.	716 plants.
Pears (Grafted) ...	3 „	316 „
Nutmeg (seedlings) ...	159	472
Other Economics ...	1,085 plants.	8,738 plants.
Seed Coconuts ...	6	30

Botanic Gardens and Nurseries.

110. Further sections of the old Pipe Lines were put into commission again, enabling the greater part of the flower garden to be watered by hose. The irrigation tank was dismantled and removed. The planting of trees, palms and shrubs, etc., in the flower garden and park lands included a number of plants new to the Gardens. A further section of the paths was repaired and re-surfaced.

111. In the Nursery an extension was made to the rockery. A larger number of mangoes was grafted than in previous years, and the output of budded citrus plants was also greater than for some years past. The usual exchange of plants and seeds with allied institutions and private individuals was carried out and included a number of new introductions to our collection.

Livestock.

112. Certain alterations were made to the Stock Farm during the year—the pig paddocks and poultry sections have been extended while an incubator house and a barn for the storage of rice straw for bedding were built. Three additional paddocks for cattle, each with a water supply, have been also erected. Sales at the Stock Farm of all classes of stock were as follows:—5 Holstein-Friesian, 4 bulls and 1 cow; Pigs– 1 boar, 1 sow and 53 young stock; Poultry—78 young stock and 3,796 eggs; Ducks—11 young stock and 425 eggs. The distribution of stock at the Government breeding stations was as follows;—Georgetown:—5 Holstein-Friesian bulls, 2 Guernsey bulls; 1 cow and 2 heifers, (Holstein-Friesian) 1 cow and 2 heifers (Creole); 1 boar and 4 sows (Canadian Berkshire); 8 pens poultry, 4 pens ducks, 1 Jack donkey, 2 Colts, 2 working donkey mares; Leguan:—1 Guernsey bull and 1 pen poultry; Forest Station:—1 Holstein-Friesian bull. The number of cows brought for service to the Stock Farm was 359 as against 365 last year. Services by the Jack donkey amounted to 23.

Chemistry.

113. All the members of the staff of the Division were on duty throughout the year. During the latter half of the year Mr. S. Duncan was appointed as a Chemist to Messrs. Booker Bros. McConnell & Co., Ltd., and was seconded for soil work in the Division. Mr. Duncan has been in charge of examination of soil samples from the sugar estates for advisory purposes. He has also been exploring various methods for assessing changes in texture of flood-fallowed soils.

11. The number of soil samples analysed for advisory purposes has increased indicating that greater advantage is being taken of this service. The number of sugar-cane samples analysed at the Sugar Experiment Station has very markedly increased while the number of miscellaneous samples examined also shows an increase.

115. The activities of the Division have included advisory work in connection with the soils of the coastal belt and of the interior. The chemistry of crop production and manufacture forms a large part of the work. The Division has been consulted on numerous occasions regarding the design and statistical treatment of the results of agricultural experiments. During the absence on leave of Mr. H. D. Huggins, Agricultural Superintendent, the examination of the results of an economic survey of the cane-farming industry of the East Coast, Demerara, was under the direction of the Chemist-Ecologist.

116. During the year the Chemist-Ecologist was appointed a member of a committee, consisting of the Government Medical Officer of Health (Chairman) and the Government Analyst, to submit a survey report on human nutrition in the Colony.

117. Field and laboratory work on the interesting and important subject of flood-fallowing has continued. It has always been recognised that one of the obvious improvements resulting from this practice was the beneficial effect on soil texture. There is yet no simple and reliable field method for the measurement of this characteristic. Trials were made with a revolver bullet penetration method and with sieving method but the properties of the clay soil militated against success. Improvements in crop yields appear to be due to an improvement in texture consequent upon flooding.

118. There have been many explanations of the inauguration of flood-fallowing and numerous people are credited with the discovery of its beneficial effects. It is interesting, therefore, to note that the Dutch proprietors in 1820 were well aware of the necessity of treating worn-out lands by lengthy submergence.

119. During the year laboratory work stressed the very definite acidifying effects of applications of sulphate of ammonia to the Colony's sugar cane soils. A large number of topsoil samples was collected from the plots of experiments involving graded dressings of sulphate of ammonia. These samples were examined as regards their normal exchange reaction and theoretical lime requirements. The results were capable of statistical examination and proved that, even in short periods of crop cycle, soil acidity markedly increased. These experiments indicated that a total application over three crops of 10 cwt. per acre of sulphate of ammonia required an initial dressing of 15 cwt. per acre of limestone to offset its acidifying effects.

120. During the past eight years the Department has emphasised the fact that the sugar cane soils of the Colony are becoming progressively more acidic. It is startling that measurable effects are obtained in three years. These investigations raise questions of fundamental importance to sugar-cane agriculture in this Colony. The Department has often been consulted in connection with fields of pegasse soil where cane refused to grow. It has been shown that soil acidity is too intense in these fields to permit of normal cane growth. Such conditions cannot be economically righted. It behoves planters to make protective dressings of limestone at planting and to consider the results of the recent experiments established by the Department

with non-acidifying nitrogenous fertilisers. There are, at present, two schools of thought in the planting community. The one school makes small but regular applications of limestone in order to preserve the *statu quo ante*. The other school is prepared to live upon the soil capital.

121. Flood-fallowing trials have indicated the benefits derived from dressings of limestone applied before planting. Estate trials on this question should be initiated by the planters themselves.

122. A large number of samples of final molasses from certain estates were examined in great detail. Preliminary work concerning the factors affecting the quality of parboiled rice has been commenced but serious investigations cannot be undertaken until suitable milling equipment is available. A visit was paid to the rice mill of Mr. H. N. van Dyk at Nickerie, Surinam, and experiments on the artificial drying of sodden parboiled rice were undertaken.

123. Investigations of the lime status of grapefruit soils and comparable analyses of leaves from healthy and unhealthy trees confirm previous findings that the lime problem on such soils is of considerable importance.

124. Root samples of the Local Haiaris *(Lonchocarpus Nicou)* have been examined as regards their rotenone content. It appears that the amounts of insecticidal substances present in the samples so far analysed is low.

Plant Pathology and Botany.

125. There were no serious diseases of crops reported for the year under review, and the sclerotial disease of rice noted in the previous year did not occur again.

126. A short article on the Haiaris and other Fish Poison plants of the Colony was published in the Agricultural Journal of British Guiana Vol. VII, No. 3, together with a note on the vegetation of the foreshore and the changes taking place as a result of silting and operations connected with the Sea Defence.

127. The routine work of the Jenman Herbarium was continued, and the card index of the Phanerogams in the Herbarium completed. A further number of specimens collected in various parts of the Colony during the last two decades were sent to Kew, and determinations received therefrom.

Entomology.

128. *Sugar-cane.*—With the establishment of the Amazon Fly throughout the sugar growing area, it was confirmed that this insect, although it readily attacks the black-headed moth-borer *(Diatraea saccharalis)* was not attacking the yellow-headed moth-borer *(Diatraea canella)* in sufficient numbers to exert a controlling influence. Trials were undertaken during the year to test the possibility of rearing a strain of the parasite that would attack the yellow-headed borer, but these were not encouraging. A careful investigation of the status of the Amazon Fly and its effectiveness in the field is in progress.

129. The Yellow Cane Aphis and 'Hardback' beetles also received attention. A substantial contribution to our knowledge of the Cane Aphis has been made by Mr. F. A. Squire, formerly Supernumerary Entomologist in the Department. As regards control of this pest correspondence was initiated with Dr. S. M. Dohanian, Associate Entomologist of the Bureau of Entomology and Plant Quarantine, United States Department of Agriculture, with a view to securing parasites which were thought to exist in Puerto Rico. Dr. Dohanian, who had been working in British Guiana and was familiar with local conditions, replied that he was unable to send parasites for the control of the yellow cane aphid, since none were known to exist. He also quoted the following paragraph from a letter sent him by the Head of his Bureau at Washington:

> "I have made inquiries as to the records which are available regarding the natural enemies of this aphid in the United States and find that no parasites

are on record, though a considerable number of Coccinellids, which have a rather general feeding habit, have been recorded as attacking it. These, however, would hardly be worth forwarding inasmuch as their presence in infestations of this particular aphid is only incidental and there are doubtless a considerable number of other beetles present in British Guiana of similar habit."

130. *Rice.*—Investigations on certain pests attacking stored rice and padi were continued during the year. The usual outbreaks of rice caterpillars and padi bug occurred during the year but were not especially severe owing to weather conditions being unfavourable to these insects.

131. *Coconuts.*—An extensive and successful "clean up" campaign was undertaken in connection with a severe outbreak of the Coconut Caterpillar. In this campaign the new Plant Disease and Pests (Prevention) Ordinance was put into operation for the first time. The success of the campaign was in a large part due no doubt to the knowledge of the existence of suitable legislation.

132. There was a small outbreak of the large locust *Tropidacris* in the Corentyne District, but no serious damage was inflicted.

133. *Rats.*—A very extensive outbreak of rats occurred at Plantation Blairmont, Berbice. The rats invaded the estate from the adjacent savannahs and the damage caused by them was extensive. The species concerned is *Holochilus* sp. and a study is being made of the habits, life history, etc., in co-operation with the estate authorities who have made strenuous efforts to control the pest by means of baits and catchers.

AGRICULTURAL EDUCATION.

School Gardens.

134. There are six registered school gardens in the Colony—two in each of the three counties. The work forms part of the schools' daily curriculum, the agricultural activities in the gardens are supervised by the Agricultural Officers. Good work has once more been done by the pupils. Seed obtained from Messrs. Sutton & Sons, Reading, England, and Messrs. Peter Henderson, U.S.A., has been distributed free to all gardens.

135. Encouragement has also been given to various unaided school gardens by way of free distributions of seed and the District Officers have visited and given instructions whenever possible.

136. Competitions for the best all round garden of both registered and unregistered schools were run by the Education Department during 1936, awards being made on the recommendations of the Department of Agriculture. The prize for the best all round registered school garden was awarded to the Sans Souci Methodist School, Wakenaam, and that for the unaided gardens went to the Unity Canadian Mission, E.C., Demerara. The individual prizes were awarded to pupils in the Sans Souci Methodist School, Stewartville Congregational School, W.C., Demerara, Plaisance Church of England School, E.C., Demerara, and to the Wortmanville R.C. School.

Rural Science and Elementary Agricultural Courses.

137. With a view to providing an agricultural basis in the primary education of this Colony, sixteen school teachers were selected by the Director of Education to attend the Rural Science and Elementary Agricultural Courses given under the ægis of the Department of Agriculture. A member of the Department of Education's staff was in general charge of the teachers and the lectures were delivered by members of the Department of Agriculture's staff, for which purpose the Girl Guides Pavilion was used. Practical work was carried out at the Botanic Gardens and adjoining Experiment Stations, and a model school garden was laid out, in which each teacher was responsible for his own plot. A test was held half way through the course and an examination at the completion of it.

138. The Farm Journal which was issued during the year, is distributed to these teachers and is also used in the course of instruction for reference purposes.

Field Days.

139. Field Days were held at Sophia Sugar Experiment Station on June 29 and July 6 for members of the Sugar Estates' staffs. The Director of Agriculture, the Cane Agronomist, the Chemist-Ecologist and the Entomologist gave short talks on various aspects of the sugar research work being carried on. The visitors had lunch at the Station. Both excursions were well attended and the visitors expressed their appreciation of the arrangements made and the opportunity given for discussion of points of mutual interest. It is hoped to repeat these 'Field Days' on future occasions to enable more members on the Estates' staffs to visit the Station.

140. A Farmers' Field day was held in the Botanic Gardens on September 21 and was attended by over 200 farmers. The visitors were conducted through the Sugar Experiment Station, the Rice Experiment Station, the Livestock Farm, the Demonstration Apiary and the Nurseries. Interest was also evinced in the plot cultivations of minor crops, *i.e.*, dwarf coconuts, bananas, plantains, pineapples, mangoes, cassava, etc.

AGRICULTURAL ECONOMICS AND STATISTICS.

141. Previous reports have made reference to the studies carried out by the Economic Division in regard to agricultural credit, seasonal variation in prices and exports, index prices of the Colony's chief import and export commmodities and prices and imports of agricultural fertilisers. During the year there was published a study on "Prices, Cost of Living and Wages in British Guiana" to which extended reference was made in the "Report of the Commissioners appointed to enquire into and report on the Labour Disputes in Demerara and Berbice during the months of September and October, 1935." The system of weekly price recording for locally grown products has been maintained, with a weekly despatch by telegram to outlying districts. There are also collected and recorded quotations on the London market—reduced to an f.o.b. Georgetown basis—for the chief export products. The first economic survey undertaken in this Colony was completed, information being collected in the most important cane-farming area in the Colony. With the information that is acquired, it becomes possible to establish actual data as the basis for agricultural policy in extension work.

142. The Officer-in-Charge of this Division attended and represented the Colony at the International Conference of Agricultural Economists at St. Andrews, Scotland, from August 30 to September 6, 1936. Under the aegis of the Conference, a tour was undertaken of most of the important Agricultural Institutions in Scotland, Wales and England. Not only was there great advantage accruing from the personal contacts made, but in many of these Institutions the Agricultural Economics Programme is, like that in this country, of relatively recent organisation.

CO-OPERATIVE CREDIT BANKS.

143. The Credit Banks, which operate under the provisions of Ordinance No. 28 of 1933, continue under the Chairmanship of the District Agricultural Officers, while the duties of Registrar and Auditor are perfomed by Mr. W. G. Delph, who is attached to headquarters staff. The Director of Agriculture is the Chairman of Co-operative Credit Banks' Board and the Registrar is the Secretary.

144. There were on December 31, 1936, twenty-seven banks on the register—fifteen in Demerara, eight in Berbice and four in Essequebo. At the close of the year the membership of the twenty-four functioning banks was 10,786; West Indians owned 47,600 shares, and East Indians 28,032 out of a total issue of 81,375.

145. The lending capital of the banks is derived from two main sources—share capital subscribed by members and Government loans, the balance due to Government being $20,961.16 at December 31, 1936.

146. Loans are made by the Credit Banks to members only and these are chiefly small agriculturalists with valid security, raising crops of padi, sugar-cane, ground provisions, etc. Some business is also done with persons engaged in coconut oil manufacture, pig-keeping, huckstering, diamond seeking, etc. Money is also lent for repair of buildings and for purchase of properties.

147. In the following table a comparison of the business done in1935 and 1936 by all the banks in the Colony is made.

Year.	Number of Loans.	Amount Lent.	Loans Recovered.	Interest Collected.
1936	1,269	$ 36,320 29	$ 35,076 28	$ 10,192 57
1935	707	21,131 97	20,404 01	9,086 71
Increase	562	$ 15,188 32	$ 14 672 27	$ 1,105 86

148. Under the "Rules for Co-operative Credit Banks' provision is made for the building up of reserve funds out of profits on the basis of 4 per cent. per annum of the paid-up capital of a bank at the end of its financial year. The total amount of investments carried out by the banks in this connection at December 31, 1936, was $33,701.84 and, in addition, $792.30 was further allocated by the various banks for 1936 to be invested later. There is also a Secretaries' Guarantee Fund in connection with the banks which stood at $3,804.89 at the end of 1936.

ADVISORY BOARD OF AGRICULTURE.

149. Meetings of the Advisory Board of Agriculture were held during the year. The Board considered the question of the establishment of an export trade in plantains, and the report of the Sub-Committee (of which the Deputy Director of Agriculture was Chairman) appointed to investigate and make recommendations in this connection was submitted to Government together with the Board's recommendations. The publication of a popular type of magazine more especially for the small farmer was also considered. The Board discussed the Agricultural Show which it had been decided to hold in Berbice in 1937. Consideration was given to the Banana Producers' Association's request for a grant of $15,000 to enable advances to be made to farmers for cultivation of bananas and for operating expenses of the Association in its initial stages. This was not favoured by the Board who recommended that two five-acre blocks be established by the Department—preferably in the Canals Polder and on the East Bank, Demerara.

150. The following members of the Board were on leave during the year:—Hon. F. J. Seaford as from March 10 and Mr. W. H. Richards as from March 1. The Hon. M. B. G. Austin was temporarily appointed a member of the Board *vice* Mr. Seaford and Mr. C. H. Palmer for Mr. Richards.

PUBLICATIONS AND LIBRARY.

151. The Agricultural Journal of British Guiana, the quarterly Journal of the Department, continued to appear during 1936. The second number of Volume VII was devoted entirely to rice.

152. In July, the Farm Journal made its appearance. As stated in the first editorial, it is published for the benefit of the small farmer in order to provide in simple language information of value and interest to him and his home circle.

153. The Director of Agriculture, Professor J. S. Dash, gave a second broadcast talk entitled "What's New in Agriculture" in January, and published in the Commercial Review, October, 1936, an article entitled "The Colony's Minor Industries."

154. Sugar Bulletin No. 5 was published during the year.

155. A revised Plant and Seed Exchange List was published during the year.

156. A letter on the subject of "Fertile Sugar Cane x Millet Hybrid" by Messrs. C. H. B. Williams and C. Cameron appeared in "Nature," May 16, 1936.

157. Two articles—"Insect Life of Temporary Rain Swamps of British Guiana" and "Observations on the Pupal Respiration of Some Insects of Economic Importance" by Mr. F. A. Squire, appeared in "Nature" July 25, 1936 and "Bulletin of Entomological Research" September, 1936, respectively.

SECTION III.

ADMINISTRATION.

Staff.

158. Professor J. S. Dash, Director of Agriculture, accompanied a Trade Mission on a visit to Trinidad and Barbados to make investigations on behalf of the rice industry. He was absent from January 5–16. Prof. Dash also had conversations with the Governments of Trinidad and Barbados on various trade matters.

Mr. F. A. Squire, Supernumerary Entomologist, left the Colony on February 21, after completing his term of appointment in this Department.

Mr. E. M. Peterkin, Agricultural Superintendent, left the Colony for Barbados on $3\frac{5}{30}$ months' leave of absence as from February 21 to May 26, 1936. He resumed on June 5, 1936.

Mr. E. M. Morgan, Agricultural Instructor, returned from leave in the United States on July 18. He had been granted six months' leave of absence as from August 26, 1935 to February 25, 1936, and was on half pay leave from March 25 to July 2, 1936. During his leave Mr. Morgan took a course in agriculture at Tuskegee Institute.

Mr. H. D. Huggins, Agricultural Superintendent, was granted $4\frac{7}{30}$ months' leave of absence as from June 4, 1936 to be spent in the United Kingdom. He was granted duty leave to attend the Fourth International Conference of Agricultural Economists which was held in Scotland. Mr. Huggins returned to the Colony on November 20, 1936.

Mr. L. E. Codd, Plant Breeder, was granted six months' leave of absence as from July 7, 1936, at the expiration of which he resigned the post to accept a similar one in South Africa.

Mr. C. H. B. Williams, Cane Agronomist, left the Colony on August 2 on six weeks' leave of absence, returning on September 11.

Mr. H. B. France, Agricultural Assistant, was granted $6\frac{1}{2}$ months' leave of absence to be spent in the United Kingdom. He returned to the Colony and resumed duty on November 18, 1936.

Mr. J. D. Gillespie, Agricultural Superintendent, left the Colony for the United Kingdom on $3\frac{22}{30}$ months' leave of absence, as from December 9, 1936.

Professor Dash was granted two weeks' casual leave of absence as from August 13–28 which was spent in Barbados. He was also granted $4\frac{24}{30}$ months' vacation leave of absence as from December 20, 1936.

During Prof. Dash's absence Mr. F. Burnett, Deputy Director was gazetted to act as Director of Agriculture, and Mr. E. M. Peterkin, Agricultural Superintendent, was appointed to act as Deputy Director.

Mr. C. Williams, Laboratory Assistant, was granted three months' leave of absence to be spent in Barbados as from December 22, 1936.

Expenditure.

159. The total vote assigned to the Department by the Legislature at its Session for the year was $117,332.00. The following expenditure was voted on Supplemetary Estimates during the year :—

		Excesses to be met from savings on other sub-heads.
Unfixed :—		
1 (17) Cane Agronomist	$120 00	
Other Charges :—		
4 Library and Publications	200 00	
24 School Gardens	500 00	$820 00

TABLE XIV.

ANNUAL ESTIMATES, 1936.

No. of Sub-vote.	Sub-vote.	Balance Unexpended.	Excess Expenditure.
1 (1-15) ...	Personal Emoluments—Fixed	$ 442 45	
(15-28) ...	do. do. —Unfixed	783 74	
	Other Charges—		
2 ...	Allowances for upkeep of bicycles	37 50	
3 ...	Travelling Expenses and Subsistence Allowances ...	162 44	
4 ...	Library and Publications	...	$ 157 17
5 ...	Furniture	1 43	
6 ...	Freight	92 77	
7 ...	Uniforms for Messengers...	85	
8 ...	Uniforms for Supernumerary Constables	2 08	
9 ...	Miscellaneous	16 42	
10 ...	Provision and Maintenance of Scientific Apparatus and Equipment ...	8 59	
11 ...	Botanic Gardens, Maintenance of	03	
12 ...	Upkeep of Government Gardens and Grounds	07	
13 ...	Purchase, Production and Distribution of Seeds and Plants	59 06	
14 ...	Experiment Stations	19 23	
15 ...	Apiary, Maintenance and upkeep	3 77	
16 ...	Livestock	51	
17 ...	Grants-in-Aid of Agricultural Associations, Exhibitions and Competitions ...	35 80	
18 ...	Rice Grading Expenses	148 95	
19 ...	Agricultural Apprentices...	77	
20 ...	Veterinary Preventive Measures	228 38	
21 ...	Plant Pests Preventive Measures	55 41	
22 ...	Contingencies	37 10	
23 ...	Soil Surveys	64	
24 ...	School Gardens	...	446 97
25 ...	Experiments with Plants of Insecticidal Value	3 20	
	Total Excesses or Savings	$ 2,141 19	$ 604 14

160. The payments into the Treasury for the year were as follows :—

Agricultural Stations	$ 2,521 25
Botanic Gardens	546 83
Sale of Official Publications	109 20
Rice Grading Samples, etc.*	9 13
Sundry Reimbursements	3,000 00
Auction Duty	5 19
Sundries	65 43
	$ 6,257 03

AGRICULTURAL LEGISLATION.

161. The following is the agricultural legislation which was enacted during the year :—

1. *Importation of Bees (Amendment) Ordinance,1936, No. 8 of 1936.* In this Ordinance provision is made for the seizing, and if necessary the destruction of beekeepers' stock or bees imported in contravention of the regulations. Provision is also made for compensation of the importer in the event of the destruction of stock or bees being unwarranted.

*Does not include Rice Grading Fees collected, for convenience by the Customs Department.

2. *The Animals Diseases Ordinance, 1936—No. 29 of 1936.* This Ordinance makes it compulsory for all Veterinary Surgeons to be registered with the Director of Agriculture. Every veterinary surgeon having reason to suspect that an animal is suffering from certain specified diseases must forthwith notify the Director of Agriculture. The qualifications necessary for registration are stated. The Governor-in-Council is enabled to declare 'ports of entry' and no person is allowed to import any animal save through the port of entry, which applies to that animal. Power is given to control the type and country of origin of all animals which may be imported into the Colony. No animal may be imported except on the written permission of the Director of Agriculture. The precautions to be taken against the spread of disease are defined, and power is given to the Governor-in-Council to pass regulations which may be considered desirable to prevent such spread.

ACKNOWLEDGEMENTS.

162. In conclusion, I should like to express my appreciation of the loyal help rendered by the staff during the year. The thanks of the Department are due also to the agricultural and mercantile community for assistance generously rendered, and to the local newspapers for their courtesy in distributing agricultural information.

J. SYDNEY DASH,
Director of Agriculture.

June 15, 1937.

SUGAR EXPERIMENT STATIONS' COMMITTEE.

Director of Agriculture, Chairman, *ex-officio*		
Hon. M. B. G. Austin	...Georgetown	Representing the Sugar Industry which maintains the Stations.
Mr. J. Bee	...Pln. Albion	
,, G. M. Eccles	... ,, Blairmont	
,, J. C. Gibson	... ,, Port Mourant	
,, A. Murison	... ,, Pln. Uitvlugt	
,, R. E. Rhodes	... ,, Diamond	

CO-OPERATIVE CREDIT BANKS' BOARD.

Director of Agriculture, Chairman, *ex-officio*		
Dr. the Hon. J. B. Singh	...	Members.
Rev. A. E. Dyett	...	
Mr. C. Farnum	...	
Hon. J. L. Wills	...	

DISTRICT AGRICULTURAL COMMITTEES.

East Demerara.

Director of Agriculture, Chairman.		
District Commissioner.		
Deputy Director of Agriculture	...	Members.
Hon. J. I. D'Aguiar	...	
,, E. M. Walcott	...	
Mr. W. H. Richards	...	
,, J. E. Wills	...	
,, S. Andries	...	
,, M. Ghani	...	

West Demerara.

Director of Agriculture, Chairman.		
District Commissioner.		
Deputy Director of Agriculture.		Members.
Hon. J. B. Singh	...	
,, J. W. Jackson	...	
Mr. A. Murison	...	
,, R. B. Hunter	...	
,, R. P. Carryl	...	
,, J. C. Da Silva	...	
,, W. Ramdeholl	...	
,, A. Rayman	...	